

quite clear. Colour copper, very dark in centre, but bright near edges. Limb easily seen through telescope. No occultations.

*Perth Observatory, W.A.:*  
1902 April 29.

*Observations of Jupiter made at Mr. E. Crossley's Observatory, Bermerside, Halifax, during the months of July, August, and September, 1901. By Joseph Gledhill.*

The following observations of the bands, spots, &c. on the surface of *Jupiter* were made with the 9-inch Cooke refractor (photo-visual). Owing to the considerable south declination of the planet and the unsettled weather it was impossible on any occasion to obtain a really fine view of the details of the markings on the disc. The highest power used was 240, but 150 was found to be most generally useful.

For shortness the dark bands and bright zones are designated as follows:—

<i>a</i> the S. temperate band.	<i>f</i> the S. tropical zone.
<i>b</i> the S. equatorial belt.	<i>g</i> the equatorial zone.
<i>c</i> the N. equatorial belt.	<i>h</i> the N. tropical zone.
<i>d</i> the N. temperate band.	$\lambda$ is the longitude of the
<i>e</i> the N.N. temperate band.	central meridian Sys- tem II.

The one salient feature of the disc during the whole of the opposition was the dark broad double band just S. of the equator (S. equatorial belt). There was never any bright space distinctly seen between the components of this fine belt; but, as in past years, the separation was best seen a little to the west of the preceding shoulder.

The red spot was not seen, but a faint grey wisp was once or twice glimpsed resting on the highest point of the *f* shoulder and bending south and westwards: this was probably the eastern end of the red spot or a marking connecting the eastern end with the *f* shoulder.

No warm colour and no distinct detail were seen in the equatorial zone; indeed, there seemed to be a great sameness of tint or brightness over the whole disc; no zone was notably brighter than any other away from the polar regions.

The N. component of *b* (S. equatorial belt) was usually darker than the S. one, and had many dark spots on it which projected a little into the bright central zone.

July 3, 10<sup>h</sup>,  $\lambda = 290^\circ$ . A dark spot on the N. component of *b* central about  $11\frac{1}{2}^h$  ( $\lambda = 54^\circ$ ). *a* and *c* faint grey bands. Rough measures: the double dark band *b*  $3''\cdot8$  in width; the central bright zone *g*,  $3''\cdot8$  wide; *a*  $1''\cdot4$ ; *f*  $2''\cdot3$ ; *c*  $1''\cdot4$ ; *h*  $3''\cdot2$ .

S S

July 13,  $9\frac{1}{2}^h$ ,  $\lambda = 336^\circ$ . *a* as dark or darker than *c*; *b*, as usual, the darkest band and the broadest; the N. component of *b* much darker than the S.; *c* faint and narrow; *d* well marked and as dark as *c*; *e* faint and broader than *d*.

July 15,  $9^h$ ,  $\lambda = 259^\circ$ . *a*, *c*, *d* faint; the western half of *a* is darker than the eastern half. At  $10^h$ ,  $\lambda = 295^\circ$ : zone *f* much narrower than zone *h*; *h* is nearly as wide as *g*; zone *h* is the brightest; the N. component of *b* is much broken up and is darker than the S. component.

July 17,  $10^h$ ,  $\lambda = 236^\circ$ . A grey cloud or large spot lies on the S. edge of the great double S. equatorial belt *b*: it projects into the S. tropical zone until it nearly touches the N. edge of the S. temperate band *a*.

July 19,  $10^h$ ,  $\lambda = 176^\circ$ . The N. component of *b* is much broken up; *a* and *c* are faint; *d* is broader than *c*; *e* (the N. temperate band) is narrow; a faint band is seen to the S. of *a*.

Aug. 15,  $8^h$ ,  $\lambda = 182^\circ$ . The dusky cloud or spot on the S. edge of *b* is seen.

Aug. 16,  $8^h$ ,  $\lambda = 353^\circ$ . A bright gap or break in the S. component of *b* is seen: it was central about  $7^h 53^m$ . *a* is broader than *c* or *d*; *d* is the faintest band.

Aug. 18. About  $8^h 45^m$  a dark piece of (or dark spot on) the N. component of *b* was central; a similar one precedes it. They are not rounded but rectangular forms. Band *a* is nearer to *b* than *b* is to *c*. At  $9^h$ ,  $\lambda = 329^\circ$ ; a bright gap or break in the N. component of *b* was seen: it is close behind the dark spot and on the central meridian.

Aug. 19,  $10^h$ ,  $\lambda = 166^\circ$ . A dark spot on the N. component of *b* seen on central meridian about  $10^h 18^m$ . Bands *c* and *d* darker than *a*; *d* is broader than *a* or *c*.

Aug. 20. A dark spot on *b* was central about  $7^h 42^m$ . A few rough measures were made: S. pole to middle of double band *b*  $16''\cdot6$ ; N. pole to same  $23''\cdot3$ ; the sum gives the polar diameter,  $39''\cdot9$ . [The computed value is  $41''\cdot33$ .] Width of double band *b*  $3''\cdot4$ ; N. edge of *b* to S. edge of *c*  $3''\cdot1$ . A dark spot on *b* was central about  $7^h 35^m$ ; a gap in *b* central about  $8^h 43^m$ .

August 22,  $8^h$ . Rough measures: middle of band *b* to S. pole  $18''\cdot3$ ; S. pole to S. edge of *b*  $15''\cdot6$ ; width of *b*  $3''\cdot4$ ; S. pole to N. edge of *b*  $18''\cdot3$ ; middle of *b* to *c*  $6''\cdot1$ ; *c* to *d*  $6''\cdot1$ ; *d* to N. pole  $11''\cdot5$ ; *a* to S. pole  $12''\cdot2$ ; *a* to middle of *b*  $5''\cdot4$ ; polar diameter  $41''\cdot5$ ; computed polar diameter from Mr. Crommelin's ephemeris  $41''\cdot1$ . A faint cloudy form lay on the S. edge of *b* and extended southwards quite or nearly across zone *f*: it was central about  $9^h 17^m$ . At  $8^h$  band *a* was fainter than *c* or *d*, and *d* as dark and broader than *c*.

August 24,  $7\frac{1}{2}^h$ . *a* very faint; *c* nearly as dark as *b*, but of course, as always this opposition, very much narrower; *d* much broader than *a* or *c*. N. of *d* comes a bright zone as wide as *d* is broad. A few measures: S. pole to middle of *b*  $16''\cdot9$ ;

middle of **b** to **c**  $6''.8$ ; width of **b**  $4''.5$ ; N. edge of **b** to **c**  $3''.7$ ; **c** to N. pole  $18''.3$ ; **c** to S. pole  $32''.3$ ; central zone **g**  $4''.5$ ; polar diameter  $42''.6$  [the ephemeris value  $40''.9$ ]; **a** very faint from  $7\frac{1}{2}^h$  to  $9^h$ . A dark spot on **b** (the N. component) was central about  $8^h 40^m$ . About  $9^h$  a few measures were made; middle of **b** to S. pole  $18''.4$ ; middle of **b** to N. pole  $23''.6$ ; width of **b**  $4''.6$ ; S. edge of **d** to N. pole  $10''.5$ ; N. edge of **d** to N. pole  $8''.1$ ; width of **d**  $2''.4$ ; S. pole to **a**  $10''.5$ ; middle of **b** to **c**  $6''.1$ ; **c** to **d**  $4''.7$ ; S. edge of **d** to N. pole  $11''.5$ ; width of **b**  $4''.5$ ; S. edge of **b** to S. pole  $15''.6$ ; N. edge of **b** to S. pole  $20''.3$ ; width of **b**  $4''.7$ . A dark spot on the N. component of **b** was central about  $9^h 18^m$ ; another follows it closely. The bright zone **h** is a little wider than bright zone **g**.

August 27,  $7^h$ ,  $\lambda = 169^\circ$ . **a** is faint; **d** is broader than **c**; there is a bright narrow zone N. of band **d**. A dark spot on the N. component of **b** is now near the central meridian. A narrow bright zone lies immediately S. of **a**. The region N. of **c** up to the pole is brighter than the region about the S. pole. The grey spot on **b** above named was central about  $8^h 22^m$ : it is faint and diffuse; its length is about  $4''$ , and the height perhaps about the same.

September 4,  $8^h$ ,  $\lambda = 327^\circ$ . **a** is as well seen as **c** and **d**.

September 5,  $7^h$ ,  $\lambda = 81^\circ$ . The **f** shoulder is a little W. of the central meridian. **a** is faint; **c** is narrow but darker than **a**; **d** is broader and darker than **c**.

September 10,  $7^h$ ,  $\lambda = 112^\circ$ . **a** faint; **d** broader than **c**.  $7^h 10^m$  to  $7^h 15^m$  one (or two?) dark spots on band **b** (N. component) very near or on the meridian; and the **f** shoulder is near the **p** limb.

September 11,  $7^h$ ,  $\lambda = 262^\circ$ . **a** is fainter than **c** or **d**.

September 15,  $8^h$ ,  $\lambda = 179^\circ$ . The grey spot on the S. edge of **b** is seen; probably on the meridian about  $8^h 15^m$ ; planet low and motion very great.

September 18,  $6^h$ ,  $\lambda = 197^\circ$ . **a** faint; **c** broad and well seen; **d** broad and less dark than **c**. The grey spot on **b** central about  $6^h 20^m$ .

September 20,  $8^h$ ,  $\lambda = 209^\circ$ . The grey spot on **b** central about  $8^h$ .

October 17,  $5^h$ ,  $\lambda = 193^\circ$ . The grey spot on **b** on the central meridian about  $5^h$ ? Violent motion; Sun just set; **a** faint; **c** darker; **d** still darker and broader than **a** or **c**.

Collecting the transits of the grey spot on the S. edge of **b** and lying in and across zone **f** we have:

1901.	d	h	m	°	1901.	d	h	m	°
July	17	10	15	245	Sept.	15	8	15	188?
Aug.	15	8	38	225		18	6	20	209?
	20	7	42	223		20	8	0	209?
	22	9	17	221	Oct.	17	5	0	193?
	27	8	22	219					

S S 2

*Further Observations of the New Star in Perseus made at the  
Radcliffe Observatory, Oxford.*

(Communicated by *Arthur A. Rambaut, M.A., Sc.D., F.R.S.,*  
*Radcliffe Observer.*)

This paper is in continuation of the notes on the same subject published in the *Monthly Notices* for March, April, May, June, and November 1901.

No periodical fluctuation of brightness has been noticed, but a gradual diminution at the rate of about 0.01 mag. per diem, as remarked in the last paper (*Monthly Notices*, lxii. No. 1), has been maintained. Accordingly no attempt has been made to keep a continuous watch upon the star, and the observations have been made at comparatively long intervals.

The Nova continues to become more bluish. In the last paper it was pointed out that the star appeared for the most part colourless. From the observers' notes on colour in the present paper it will be seen that a bluish tint has for the most part prevailed.

The faintness of the object, its low altitude, and the increased twilight will probably prevent further observations until the autumn.

The following instruments were employed as indicated in the third column of Table II.

Barclay	10-inch equatorial, power 90.
	2.7-inch finder                   "   13.
Heliumeter	1.8 inch finder                   "   19.

TABLE I.

*List of Stars used for Comparison with Nova Persei.*

Ref. No.	Name of Star.	Adopted Tabular Magnitude.	Authority for Magnitude.
54	Arg. Z. + 44, 734	6.23	Radcliffe estimations on Harvard Scale.
58	+ 43, 730	6.57	"       "       "       "       "
61	+ 41, 631	6.00	Harvard Photom. D.M.
62	+ 41, 638	6.16	"       "       "
63	+ 42, 736	7.00	Adopted provisionally.
64	+ 43, 720	7.25	"       "
65	+ 43, 732	7.25	Harvard Photom. D.M.
67	+ 44, 714	7.37	"       "       "
70	+ 44, 732	7.32	"       "       "
71	+ 42, 772	7.52	"       "       "
72	+ 43, 766	8.0	Argelander D.M.
73	+ 44, 717	8.5	"       "